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MEDICAL NEWS LETTER

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HISTORICAL FUND
of the
NAVY MEDICAL DEPARTMENT

A committee has been formed with representation from the Medical Corps, Dental Corps, Medical Service Corps, Nurse Corps, and Hospital Corps for the purpose of creating a fund to be used for the collection and maintenance of items of historical interest to the Medical Department. Such items will include, but will not be limited to, portraits, memorials, etc., designed to perpetuate the memory of distinguished members of the Navy Medical Department. These memorials will be displayed in the Bureau of Medicine and Surgery and at the National Naval Medical Center. Medical Department officers, active and inactive, are invited to make small contributions to the fund. It is emphasized that all donations must be on a strictly voluntary basis. Funds received will be deposited in a Washington, D. C. bank to the credit of the Navy Medical Department Historical Fund, and will be expended only as approved by the Committee or its successor and for the objectives stated.

It is anticipated that an historical committee will be organized at each of our medical activities. If you desire to contribute, please do so through your local historical committee or send your check direct, payable to Navy Medical Department Historical Fund, and mail to:

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Respiratory Stimulants

Few true antagonists are found among the numerous remedies available to physicians. Respiratory stimulants are no exception. Some physicians think that they are without benefit and never should be used; others think that they are useful in select situations. The author adheres to the latter concept. Regardless of the point of view, stimulants continue to be part of the array of drugs used in emergencies.

Situations requiring respiratory resuscitation are of two categories: drug induced and those not involving a drug. In the latter category are included respiratory failure due to anoxia, carbon dioxide excess, derangements due to increased intracranial pressure, shock, electrocution, and hypothermia. Stimulants are of no benefit when the causative factor is not a drug.

The respiratory center appears to be the first of the medullary centers inactivated by an overdose of a central nervous system depressant. Activity is restored upon removal of the drug, unless an irreversible change has resulted from overconcentration. Volatile drugs, such as nitrous oxide, ether, and chloroform are readily "washed out" of the lungs and the entire system by artificial respiration. Therefore, stimulants are unnecessary and superfluous in overdosage from these drugs. The situation is different when dealing with nonvolatile drugs, and stimulants may be of benefit.

Drugs which antagonize depression of the central nervous system are analeptics (Gr: restorative). Many drugs stimulate the central nervous system, but only a few possess the necessary controllability to make them suitable as therapeutic agents to overcome respiratory depression. Large or repeated doses of central nervous system stimulants may cause depression after initial stimulation. Respiratory failure caused by overdosage of these drugs is seldom antagonized by other analeptics.

The medulla is the primary site of action of analeptics. One type of the drug acts directly on the cells of the medullary centers, and others act indirectly in a reflex manner upon the respiratory mechanism, exerting their primary action on chemoreceptors in the carotid and aortic bodies. These, in turn, reflexly stimulate the respiratory mechanism.

Chemical or physical agents which act peripherally, such as ammonia vapor, subcutaneous ether, camphor in oil, pressure, cold, slapping, and rectal dilatation reflexly stimulate the central nervous system. Such stimuli cause arousal only when the nervous system is mildly depressed. No stimulation is actually necessary. A severely depressed central nervous system does not respond to reflex stimulation of any type whether it be chemical, mechanical, or electrical.

Sympathomimetic amines are sometimes incorrectly referred to as analeptics. These drugs, if used promptly, may restore respiratory activity

by improving cerebral blood flow and correcting medullary anemia which has resulted from hypotensive states.

The mode of action of analeptics has not been established, although far more obvious respiratory stimulation is observed when it is preceded by a depressant drug than when used alone. This strongly suggests interference with biochemical activity of the cell. Stimulating action of analeptics is most obvious on the respiratory center, although not necessarily confined to it. Excessive quantities cause stimulation to spread to other areas of the brain and may precipitate convulsions. A latent or lag period is a feature common to all analeptics, and varies with each drug.

Pentamethylene tetrazol (Metrazol), nikethamide (Coramine), and picrotoxin are established analeptics. The first two have a short latent period and relatively wide margin of safety. They are effective in mild depressions, but are of limited value in severely depressed states. Use of picrotoxin has been confined largely to treatment of protracted barbiturate coma, and has been recently supplanted to a large extent by newer drugs. It has a long-lasting effect—reaching a plateau-like peak within 5 to 20 minutes after intravenous injection, which is sustained for as long as 30 minutes. The dose is individualized by cautious fractionation of 2 to 3 mg. portions intravenously at 2 or 3-minute intervals until signs of elevation of reflex activity appear.

Benzedrine and caffeine are not suitable as respiratory stimulants in severe respiratory depression because they act primarily on the cortex and have little effect on the brain stem. They may be used for overcoming drowsiness of the recovery phase of depression from barbiturates and other hypnotics. Atropine has been used as a respiratory stimulant, but is of questionable value because its central action is feeble. Camphor, likewise, is of no practical value as a stimulant.

The most promising of the newer analeptics are bemegride and methylphenidate (Ritalin), principally because they are more effective than the older established drugs in overcoming severe depressions due to overdosage of hypnotics, particularly from suicidal attempts. The margin between the dosage which gives improved ventilation and the one which causes convulsions is wider than with picrotoxin. In additional contrast is the observation that bemegride is capable of causing arousal in most patients. The dosage of this drug varies widely, depending upon the patient, drug, and dosage increment, and ranges from 125 to 1,925 mg. It is administered in 50 mg. doses at 3 to 5-minute intervals until signs of arousal appear. Methylphenidate has been less effective than bemegride, but more effective than picrotoxin. Patients receiving 60 to 1,100 mg. have been elevated to a level of reflex activity in which they responded to painful stimuli. Treatment has been continued until the patient awakens or signs of excitation activity appear.

Routine use of analeptics following conclusion of barbiturate anesthesia has been suggested, but is discouraged. Attempts to restore patients to a

state of wakefulness cause muscle twitches, exaggerated reflexes, mild convulsive states, and disorientation.

The following objections are offered by those opposed to analeptics:

1. Analeptics neither accelerate destruction of, nor facilitate elimination of, the depressant drug. This may be a valid objection from a theoretic point of view, but practically speaking it is not.

2. After the stimulating phase, the analeptic superimposes a depression of its own upon depression caused by the hypnotic. This may occur when the drug is pushed beyond the limits of therapeutic usefulness, but can be avoided if care is exercised.

3. Analeptics increase oxygen demands of cells already depressed by coexisting anoxia. Stimulation increases cell metabolism. This is a theoretic consideration.

4. Stimulation is accompanied by side actions which include nausea, vomiting, tremors, twitching, and hypertension. These reactions vary with the drug.

5. Convulsions may follow inadvertent administration of an analeptic to a patient who is mistakenly assumed to be overdepressed, or the inadvertent overdosage to one who is depressed. The margin between the medullary stimulating dose and that which causes convulsions is narrow with some stimulants.

Other drugs which have effects seeming to stimulate respiration are antinarcotics. Nalorphine is primarily effective in reversing the respiratory depression caused by opium alkaloids and synthetic narcotics. Restoration of respiration is sustained so that repeated administration is not necessary once the reversal has occurred, differing from the analeptics in this respect. Also, it is suitable for antagonizing respiratory depression due to meperidine, Dromoran, alphaprodine, methadone, and anileridine. Levallorphan (Lorfan) is pharmacologically similar to nalorphine but more potent—5 to 10 times.

Ordinarily, 5 mg. of nalorphine intravenously causes a perceptive increase in minute volume exchange if the patient is depressed by a narcotic. Ten mg. are sufficient for complete reversal of respiratory depression—failure to induce some degree of reversal is presumptive evidence that the depression is not due to a narcotic. Doses exceeding 15 mg. may cause depression.

Carbon dioxide inhalations have been used to counteract drug-induced respiratory depression. Use of the drug for this purpose is discouraged. Respiratory centers depressed by overdosage of a drug no longer respond to elevation of plasma carbon dioxide. (Adriani, J., Respiratory Stimulants: GP, XX: 101-107, November 1959)

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Cardiac Resuscitation Problem

Resuscitation is best defined as the restoration of life after apparent death. From prehistoric time, death has been considered to be the permanent cessation of breathing, and up to 20 or 30 years ago, resuscitation consisted of artificial respiration. Modern medicine, however, has recognized the primacy of the heartbeat. In dissolution of the total organism it makes little difference whether cardiac arrest or respiratory arrest occurs first; the other is bound to follow rapidly. By the same token, resuscitation should not be regarded as either cardiac or respiratory, but as a combined operation best defined by the term cardiorespiratory.

In 1874, Schiff first recorded successful restoration of the heart beat in experimental animals by cardiac massage. Five years later, Niehaus is quoted as the first to attempt massage of the human heart after cardiac arrest, but success was not reported until 1902 when Starling and Lane accomplished resuscitation by subdiaphragmatic massage in an individual who suffered arrest during an abdominal operation. Since then, in operating rooms all over the world, cardiac massage with assisted respiration has been progressively recognized as the basic technique for resuscitation. So far as is known, the first successful defibrillation of the human heart by electric shock was performed by Beck and associates in 1947.

Cardiac arrest is generally used to define the cessation of any effective heart beat. The most common form is cardiac standstill. Regardless of the type of arrest involved, cessation of circulation leads to death of the body's tissues through hypoxia. Most susceptible to oxygen deprivation are the higher centers of the brain, with adrenal glands, liver, kidneys, and lower brain centers probably following in that order. Numerous experiments on various animals have shown that cessation of brain circulation for more than 5 minutes generally leads to irreparable damage, while restoration of circulation short of this time limit is followed by a high incidence of complete recovery. Clinical series in man suggest that 3 to 5 minutes, with perhaps an average figure of 4 minutes, represents the critical time limit for restoration of full cerebration. Success is directly correlated with the speed with which cardiac massage and proper ventilation are begun.

In those cases in which effective pulmonary ventilation is established within an appreciable time before cardiac massage can be started, the safe limit may be slightly longer. Thompson has shown that mechanical methods of ventilation in asphyxiated dogs cause a slow advance of blood through the circulation presumably by means of alternate dilatation and contraction of the pulmonary capillaries. Recently, some evidence has appeared indicating that individuals with apparent severe brain damage may make complete recoveries if promptly subjected to hypothermia that is continued for 2 or 3 days.

The great majority of reported cases of cardiac resuscitation have occurred in the operating room. Extensive hospital series suggest that arrest

may occur as often as once in every 2,000 anesthesias and that, therefore, there may be 5,000 instances each year. Because the precipitating factors in the susceptible individual are generally a combinatiom of hypoxia and vagal stimulation, emphasis is placed on prevention.

Beck has divided treatment of cardiac arrest into two steps: reestablishment of the oxygen system by assisted breathing and cardiac massage; and restoration of the spontaneous heart beat. This division is important because it emphasizes the emergency of getting oxygenated blood flowing through the circulation by mechanical means and leaves other factors, such as defibrillation of the heart and reawakening of the respiratory center, for subsequent consideration. Intracardiac injection of drugs is usually of secondary value. Administration of epinephrine (3 to 5 ml. of 1: 10,000 solution) strengthens ventricular contraction and may help to initiate spontaneous contraction when the heart, in standstill, has been massaged for several minutes. Procaine (3 to 5 ml. of a 1% solution injected into the right ventricle) is indicated in the attempt to terminate ventricular fibrillation if electric shock is ineffective.

The emergency of cardiac resuscitation is such that even in the operating room sterile technique is not attempted. While the anesthetist establishes the airway and begins ventilation with 100% oxygen, the surgeon quickly opens the chest and begins massage. Proper surgical closure is not carried out until both heart beat and respirations have proved their ability to continue spontaneously.

Since 1950, there have appeared reports of astonishing revivals following cardiac massage outside the operating room. This has led to a school of thought which advocates that all internists be equipped with sharp penknives. The complications that could result from overuse of cardiac massage by inadequately trained personnel can easily be imagined.

When confronted with an apparent case of sudden exitus not in the operating room, the first duty of the physician is to confirm that cardiac arrest has really occurred. He should then note the time. If he believes there is a chance that this is one of the rare medical instances where cardiac resuscitation is indicated, he should then shout for trained assistance because it is obvious that one person cannot massage a patient's heart and breathe for him at the same time.

A simple technique occasionally effective in resuscitation is pounding on the anterior chest. One good pounding can do little harm, but repetitive efforts waste time. Needling of the heart is generally not to be recommended. Recently, resuscitation through use of an external electric stimulator has been advocated and has achieved fair success. Other than in Stokes-Adams attacks, this may not be the most desirable form of resuscitation, and may waste invaluable time if thoracotomy subsequently must be performed.

To help the physician decide whether to attempt cardiac massage when confronted with cardiac arrest, the following questions are proposed:

(1) Has the patient the fundamental health to justify restoration of life? (2) Is it reasonably certain that there is still time to institute massage and that the critical time limit (4 minutes) during which full restoration is still possible has not passed? (3) Has the physician the training, equipment, and assistance necessary to undertake both cardiac massage and assisted respiration, and to carry them through to a successful conclusion? (4) Is the arrest iatrogenic?

At the present time, it would seem to be only the rare case occurring outside the operating or recovery room that would fulfill the foregoing requirements. (Southworth, H., The Resuscitation Problem: Circulation, XX: 946-951, November 1959)

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Iron Deficiency in Gynecologic Patients

Iron deficiency anemia among adults in the United States occurs almost exclusively as a result of chronic blood loss. In the absence of blood loss, inadequate iron intake can lead to anemia only after prolonged deprivation. Dietary restriction of iron may become limiting under circumstances in which requirements are increased, as during pregnancy, lactation, rapid growth of infancy and childhood, or with chronic mild hemorrhage, such as excessive menstruation. This study illustrates the nature of this blood loss effect on the therapeutic response to iron and to iron plus other hemopoietic preparations in the management of menorrhagically induced iron deficiency anemia.

A series of women in their reproductive period of life—all with confirmed iron deficiency anemia—were studied in relation to response to oral ferrous sulfate, an oral liver concentrate elixir, or liver concentrate plus added ferrous sulfate.

Initial therapeutic responses show that regardless of iron dosage level hemoglobin concentration can be raised from as low as 4 gm./100 ml. to values in excess of 10 gm./100 ml. within 4 weeks after initiation of iron therapy. These data indicate: (1) maximum effectiveness achieved with therapeutic iron at the level of 100 to 300 mg. per day; (2) no superiority in initial response or relapse time on 300 mg. per day dosage; (3) no difference in therapeutic efficacy between 100 mg. of iron alone and liver concentrate (containing 60 mg. iron per day plus a variety of other nutrients and an added 40 mg. of iron); (4) slower rate of hemoglobin regeneration with 60 mg. of iron than with 100 mg. or more; (5) liver alone (containing 60 mg. of elemental iron per day) showing no superiority to similar levels of iron alone.

Well documented evidence reveals that the average American woman has a dietary iron intake of 12 to 15 mg. per day. Of this amount, some 10% can be absorbed and utilized. Daily losses, exclusive of menses, pregnancy,

or lactation, amount to 1 mg. or less. Hence, she is easily able to maintain iron balance.

During pregnancy, fetal and maternal demands for iron are increased, but so is the mother's ability to absorb this nutrient. Evidence indicates that during the third trimester of pregnancy from 3.6 to 4.5 mg. of iron per day may be absorbed from a dietary intake of 12 to 15 mg. As a result, in absence of complicating blood loss during pregnancy, delivery, or postpartum, iron deficiency anemia does not develop in a normal pregnant woman. The usually accepted amount of menstrual blood loss is from 35 to 70 ml. per period which is equivalent to 14 to 28 mg. of iron per menses. To meet this normal loss, the woman needs an additional 0.5 to 1.0 mg. of iron per day to maintain a constant level of hemoglobin. From such reasoning, one might conclude that only the woman having minimal menstrual bleeding could maintain her hemoglobin concentration. However, in most women during their normal menstrual lives, progressively lower and lower hemoglobin values do not develop.

When there is repetitive excessive blood loss at the time of menses, iron deficiency anemia can, and does, occur. For practical purposes, any nonpregnant, nonlactating woman with hypochromic microcytic anemia should be considered as an excessive bleeder until positively proved otherwise.

Early recognition by the physician of the amount of blood (hence iron) that a woman can lose through repetitive episodes of excessive menstrual flow is the best preventive of iron deficiency anemia in women during their reproductive life. When the physician employs the usual means of evaluating a woman's menstrual history, the actual amount of blood loss may be underestimated.

As has been demonstrated by other investigators, this study reconfirms that the response to hemopoietic therapy of a person with iron deficiency anemia is solely the result of administered iron. The addition of trace minerals and other hemopoietic agents in "shotgun" mixtures does not enhance the patient's hematologic recovery. The level of iron therapy—100 mg. elemental iron per day—which produced maximal hemoglobin regeneration and hematologic remission time is but one-third the usually prescribed oral medication of 300 mg. of elemental iron (100 gm. ferrous sulfate) per day. There was almost complete absence of annoying side effects to the 100 mg. dosage in contrast to the recognized inability of some patients to tolerate the 300 mg. level. (McGanity, W.M., Cannon, R.O., Iron Deficiency in Gynecologic Patients: Am. J. Clin. Nutrition, 7: 638-645, November-December 1959)

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Use of funds for printing this publication has been approved by the Director of the Bureau of the Budget (19 June 1958).

Strongyloidiasis

While strongyloidiasis infection is found in all ages, the incidence of this condition in the childhood age group is not wholly appreciated, nor is the potential seriousness of the disease usually recognized. Because of the paucity of material on this subject in pediatric literature, this series is presented in the hope that those concerned with the care of children will be reminded of the potentially serious nature of the infection.

Distribution of the disease is worldwide, the greatest incidence being found in moist tropics. A conservative estimate of the incidence in North America is 400,000 infected people. One to five percent of the population in the southern United States are infected compared to less than one percent in the northern states; only scattered cases are reported in Canada. Mexico and South America have at least 10 million cases. There appears to be a seasonal variation with the greatest incidence in late summer or early autumn. Negroes are affected about one-fourth as frequently as other races. Several series indicate that at least 50% of occurrences of strongyloidiasis were in persons under 20 years of age.

The life cycle of Strongyloides stercoralis is similar to that of the hookworm. The filariform larvae develop in soil and infest the host by penetrating the skin, passing through the lymph and blood channels to the lungs, and then to the small intestine via the bronchial mucosa and esophageal route; there they develop into adults who mate. The females burrow into the intestinal mucosa where they lay eggs which hatch into rhabditiform larvae. The latter return to the lumen of the intestine where they may follow one of two courses: they may develop into filariform larvae which are infective for man; or, autoinfection may occur by means of dwarf filariform larvae penetrating the perianal skin or invading the ileum and colon from which the filariform larvae pass back to the lungs and renew the cycle.

Although the parasite does not survive refrigeration and lives less than 7 days in moist soil, it maintains itself in the soil by the free-living cycle.

Sixteen cases diagnosed at Vanderbilt University Hospital are presented. Three patients complained of abdominal pain, 4 of weakness and imperfect locomotion, 3 of diarrhea, and 3 of swelling of the extremities; other complaints were vomiting, "worms," meningitis, bumps on the legs, and "fits."

Eosinophilia, present in 13 cases, was the most constant laboratory finding. Anemia was present in 11 patients, leukocytosis in 10, and occult melena in 5. Hypoproteinemia—not heretofore reported—was present in 5 patients.

In 15 patients, the larval forms were found in stool specimens, the remaining case was diagnosed at postmortem examination.

The site of invasion may be marked by erythema, edema, and pruritus. Following cutaneous entry, the infective filariform larvae pass to pulmonary capillaries where they egress, enter alveolar spaces, and produce hemorrhages by disruption of capillary walls. From alveolar spaces, filariform larvae ascend the tracheobronchial tree and enter the gastrointestinal tract. It has been reported that some of the maturing larvae may invade the mucosal glands of the trachea or bronchi, possibly causing granulomatous reaction in the submucosal glands of the trachea.

Mature impregnated females invade the intestinal mucosa distal to the pylorus, predominantly in the duodenum and jejunum, but invasion may occur at any level. With colonic autoinfection, the filariform larvae again pass through the lung. This time the pulmonary infection may be heavy enough to cause respiratory failure.

Other findings include those expected with debilitation, malnutrition, and secondary infection—edema, emaciation, fatty liver, and moniliasis. It is not clear whether malnutrition renders the individual more susceptible to strongyloides or whether overwhelming infection produces debility. Rare lesions described in the literature include involvement of the gallbladder, liver, stomach, lymph nodes, pericardium, and genitourinary tract.

Diagnosis of the disorder is based on fitting together symptoms, signs, laboratory and radiographic findings, and skin and precipitin tests in addition to demonstration of characteristic larvae in either stools or duodenal aspirate by microscopy or by a special stool culture method. One of the most frequently found symptoms is abdominal pain; this may be diffuse, well localized, colicky, gnawing, dull or heavy, and variably affected by eating. Diarrhea is a common finding and may occasionally be bloody. Nausea, vomiting, anorexia, and indigestion occur frequently.

Occasionally, cough and, less frequently, hemoptysis and/or dyspnea occur; rarely, pulmonary symptoms are severe enough to suggest pulmonary tuberculosis.

Certain of the commonly occurring signs include fever, urticaria, edema, and jaundice. Abdominal tenderness is such a frequent finding that in one series of 100 cases, 32 patients underwent laparotomy.

In addition to changes in the blood picture suggestive roentgenographic evidence is the finding of a pipe-stem picture in the second and third parts of the duodenum. Transit time in the affected loops of duodenum is said to be slowed.

The skin test, although nonspecific, has a place in the diagnostic work-up. An adjunct to this is the precipitin test.

The sine qua non for diagnosis is demonstration of the characteristic rhabditiform larvae in stool specimens or in duodenal aspirate. A patient should not be considered cured until both duodenal aspirate and stool are free of the parasites. Another means of diagnosis is the special stool culture.

Prophylaxis of the disease is based on proper disposal of feces, wearing of shoes, and otherwise avoiding contact with soil known to be contaminated. Eradication has been difficult since the parasite was first identified in 1876 by Normand. Faust, in 1931, first suggested the use of gentian violet and, although relatively ineffective, it is still the most commonly used drug. Its ineffectiveness when given intravenously is also known.

Among the more recently tried group of drugs, including miracil D, Mantomide, Phenergan, stibophen, hexylresorcinol, quinacrine, tetracycline, fumagillin, and Hetrazan, the last has probably had the most success. The newest and most promising anthelminthic is dithiazanine (Delvex and Abminthic). Side reactions are said to be minimal.

There is also the possibility of a spontaneous cure. (Huchton, P., Horn, R., Strongyloidiasis: J. Pediat., 55: 602-608, November 1959)

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Live Poliomyelitis Vaccine Status

Leroy E. Burney, Surgeon General, Public Health Service announces that the present status of attenuated live poliovirus vaccines has been reported by the Public Health Service's Committee on Live Poliovirus Vaccine, headed by Dr. Roderick Murray, chief of the Service's Division of Biologics Standards.

The committee has reviewed the rapidly accumulating data on the development and field use of attenuated live poliovirus vaccines and has considered initial problems involved in preparation of provisional specifications for their production. It has been given responsibility for evaluating all available information, for determining what additional information is needed and where necessary, and for initiating studies to supply answers to questions that must be resolved before licensing can be recommended.

If energetic efforts to find answers to the remaining technical questions concerning safety, effectiveness, and manufacturing procedures are continued, one or more of the three vaccines now being proposed may be under production within one or two years. Meanwhile, all are urged, particularly those under 40 years of age, to complete their series of Salk injections so that no one will remain unprotected at the time of the next poliomyelitis season.

The status of live poliovirus vaccine as reviewed by the committee is:

1. Three sets of attenuated poliovirus strains have been proposed for use as oral vaccines.
2. There is considerable difference in the neurovirulence or damaging effect on nerve cells for monkeys of the three sets of strains.
3. No evidence has been reported to indicate that any vaccine produces harm to individuals to whom they were administered.

4. In some studies the ability of these strains to multiply and produce antibodies is less than could be expected on theoretic grounds.

5. A number of workers have reported that virus excreted by vaccinated individuals has shown increased neurovirulence for monkeys.

6. Field experience with any strain to date cannot be interpreted as affording reasonable proof that the community of nonvaccinated persons will be free of danger from possible reversion of virulence in excreted virus under a great variety of readily anticipated circumstances. This is one of the most important unresolved problems.

7. There is evidence which indicates that under some circumstances simultaneous administration of all three types of virus may be effective.

The committee reported the following major problems which remain to be solved before definitive decisions can be made regarding licensing:

1. Significance of increased neurovirulence for monkeys of virus excreted by vaccinated individuals.

2. Demonstration of adequate measures of effectiveness of live poliovirus vaccines in field trials which, to be definitive, must involve large population groups.

3. Development of standards to determine possible presence or absence of stray agents in the vaccine.

4. Establishment of carefully designed and evaluated studies to demonstrate production of specific antibodies in 90% or more of inoculated susceptible persons in order to assure potency of such vaccines.

(Burney, L. E., Surgeon General, Public Health Service, Live Poliomyelitis Vaccine Status: Pub. Health Rep., 74: 983-984, November 1959)

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Anticoagulant Therapy

Since introduction of heparin and bishydroxycoumarin into clinical medicine over 15 years ago, these and other similar agents have been used extensively to prevent and treat clinical conditions resulting from thrombosis or embolism. Despite considerable difference of opinion concerning the exact place these drugs should occupy in medical practice, there is no general agreement that they are effective in minimizing propagation of existing thrombi and in decreasing the incidence of embolism from such thrombi.

Heparin was the first widely used and effective anticoagulant. Both theoretic and practical considerations have led many investigators to list this as the best agent available for prevention and treatment of intravascular thrombosis. Administration of coumarin or indandione derivatives is followed by a period of 18 to 36 hours before signifcant

hypoprothrombinemia occurs, regardless of whether given orally or intravenously. A major advantage of heparin over oral anticoagulants is that an immediate anticoagulant effect is obtained following intravenous injection. A major inconvenience is that the only effective therapeutic route is parenteral. Heparin administered sublingually may produce a systemic antilipemic effect, but does not significantly alter the clotting mechanism.

The intermittent intravenous method of administering heparin results in a "picket fence" type of clotting time response, but many observers having extensive experience with this technique report excellent results. Repeated venipunctures may be avoided by insertion of a small polyethylene catheter through a needle into an arm vein. The needle is removed over the catheter which is then taped to the forearm. A small needle with syringe attached is left on the other end of the catheter. There is usually sufficient heparin within the tip of the catheter to prevent occlusion by a blood clot.

Continuous intravenous infusion—200 to 300 mg. of heparin per liter of 5% dextrose solution—is given at a rate sufficient to prolong clotting time to between 20 to 30 minutes (20-30 drops per minute). This requires frequent and very careful control of clotting times and almost continuous monitoring of the infusion rate.

Intermittent subcutaneous method employs 200 mg. of concentrated aqueous heparin administered every 12 hours. A clotting time should be performed during the period of maximum action of heparin—4 to 8 hours after injection—to be certain that adequate prolongation has been obtained. Because cumulative effect may occur after subsequent doses, clotting times must be performed at least once each day to assure that safe but effective degrees of prolongation of clotting time have been produced—20 to 30 minutes.

When heparin is administered, protamine sulfate—a heparin antagonist—should be readily available. If serious bleeding occurs, reversal of clotting time to normal may be obtained within one minute by injection of a dose of protamine sulfate approximately equivalent to the initial dose of heparin. If bleeding follows administration of heparin by the subcutaneous route, half of the protamine should be given by direct intravenous injection and the remainder by continuous intravenous infusion over the time required for absorption of heparin from the subcutaneous depot.

During the past 10 years, several heparin-like compounds, such as Treburon, Paritol, and dextran sulfate have been introduced for clinical use, but none has gained widespread favor.

Since introduction of Dicumarol, many other coumarin and indandione compounds have become available. No one of these agents has been proved distinctly advantageous over the others in prevention or treatment of thromboembolism.

In general, it is easier for a physician to learn to use the short-acting oral anticoagulants. With agents of this type, such as phenylindandione, administration of the drug twice daily is necessary for optimal control. If prothrombin "activity" values fall below the desired range, individual doses can be reduced and the result usually is reflected in the prothrombin determination performed the following day. Except in cases of extreme drug sensitivity, complete omission of dose should be avoided.

Some of the longer-acting coumarin derivatives can be administered to patients as infrequently as once every 3 to 5 days without loss of effective depression of prothrombin "activity."

Patients who need long-term outpatient anticoagulant therapy are followed with daily estimations of prothrombin "activity" until the required daily dose is established. The interval between prothrombin determinations is then gradually lengthened, so that after a period of several months determinations need be performed only every 2 or 3 weeks. Outpatients, with their greater activity and greater exposure to accidental trauma, are maintained in the range of 30 to 50% activity to avoid undue risk of hemorrhage.

Incidence of hemorrhagic complications during oral anticoagulant therapy is influenced by a number of variables. Bleeding is much more likely to occur if the prothrombin "activity" falls below 10%. It occurs only rarely with values of 40% or higher. Most bleeding episodes are minor and do not require termination of therapy. About 15% of bleeding episodes are major, requiring blood transfusion and permanent cessation of anticoagulant administration. In considering anticoagulant treatment, it should be remembered that the risk of fatal pulmonary embolism is usually far higher than the risk of fatal hemorrhage.

The only reliable antagonist to oral anticoagulants is vitamin K_1. The commonly used forms are a 5 mg. oral tablet and a 50 mg. ampule for intravenous use. For reversal of an unusually prolonged prothrombin time without associated bleeding, 2 to 4 mg. orally or intravenously is used. For minor bleeding, when anticoagulant therapy is to be continued, 5 to 10 mg. is given orally or intravenously. For bleeding of major proportion, 50 mg. is given intravenously, and repeated in 2 to 4 hours if bleeding has not ceased.

Anticoagulants should be used in the following common situations unless major contraindications are present:

1. Deep venous thrombosis and pulmonary embolism

   a. Therapeutic: in patients in whom one or both of the above diagnoses is established or suspected.

   b. Prophylactic: in patients known to be predisposed to these conditions by virtue of a prior history of thromboembolism, presence of heart disease, leg traumas, or other predisposing factors.

2. Acute myocardial infarction.

3. Some cases of cerebral arterial "insufficiency", thrombosis, or embolism.

4. Atrial fibrillation with recent or old arterial embolism, especially in patients with mitral stenosis who are not candidates for operation.

5. Retinal arterial or venous thrombosis.

Absolute contraindications to the use of these agents are:

1. Blood dyscrasias associated with a severe coagulation defect.

2. Recent cerebral hemorrhage or recent operations on brain or spinal cord.

3. Absence of reliable daily "prothrombin" determinations.

4. Severe hepatic or renal disease which makes oral anticoagulant therapy hazardous.

Other situations constitute relative contraindications and in these circumstances anticoagulants would be used only with extreme caution:

1. Any ulcerating lesion of the gastrointestinal tract.

2. Recent operations in which ligature of all bleeding vessels was not possible.

3. Large open wounds.

Vein ligation is restricted to patients in whom there exists a definite contraindication to use of anticoagulants or in whom adequate anticoagulant therapy has failed to prevent pulmonary embolism. The one exception is septic thrombophlebitis. Similarly, anticoagulants will not prevent embolism in subacute bacterial endocarditis. Patients who have repeated pulmonary emboli while receiving adequate anticoagulant therapy require interruption of both common femoral veins or the inferior vena cava, or a new operative procedure—insertion of an inferior vena cava filter. (Coon, W. W., Willis, P. W. III, Duff, I. F., Anticoagulant Therapy: GP, XX: 122-128, November 1959)

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World War II Surgeon General Dies

Vice Admiral Ross T. McIntire MC USN (Ret), former Surgeon General of the Navy and Chief of the Bureau of Medicine and Surgery, died in Grant Hospital, Chicago, Ill., 8 December 1959, at the age of 70.

Admiral McIntire, who served two four-year terms as Surgeon General of the Navy from 1938-1946, was also a longtime personal physician to the late President Franklin D. Roosevelt.

An outstanding eye, ear, nose and throat specialist during his Navy service, Admiral McIntire began a 30 year naval career in 1917 when he was commissioned an Assistant Surgeon in the Medical Corps of the Navy with the rank of Lieutenant, junior grade. After 2 1/2 years at sea aboard the USS New Orleans, for which he was awarded the Victory Medal with escort clasp, he served at a number of continental and overseas stations, and in 1931 was assigned in the Naval Hospital, Washington, D. C. In 1933 he was appointed temporary physician to the White House and in 1935 was appointed physician to the White House with additional duty at the Naval Hospital, Washington, D. C.

Following his appointment on 1 December 1938 as Surgeon General of the Navy with the rank of Rear Admiral, he directed the planning for expansion of the Navy Medical Department in the mounting national emergency. This included great and rapid increase in the numbers of all naval medical personnel— medical officers, dental officers, pharmacists, nurses, and enlisted men. Building of many new naval hospitals and expansion of facilities of those already in existence, with purchase and installation of equipment, were among these important tasks. Added responsibilities were planning for the care of the sick and wounded in various combat areas in all parts of the world. Coincident with performance of this work, it was necessary to maintain and expand research in various branches of naval medicine in order to keep abreast of the rapidly changing developments brought out by the war.

In February 1955 Admiral McIntire was promoted to the rank of Vice Admiral, thus becoming the first Navy Surgeon General to hold that rank.

Born at Salem, Oregon, on 11 August 1889, Admiral McIntire was the first Navy Surgeon General born west of the Rocky Mountains. He attended Salem public schools, and received his MD degree from the Medical School of Williamette University, now the Medical School of the University of Oregon.

Retired from the Navy in early 1947, Admiral McIntire served the following seven years as chairman of the President's Commission for Employment of the Physically Handicapped. Also, in 1947, he was appointed to head up formation of the national blood program of the Red Cross, a program he continued to serve for more than eight years. Currently, he was Executive Director of the International College of Surgeons, a post he assumed in 1955.

Interment with full military honors was held on Monday, 14 December 1959, in Arlington National Cemetary. (TIO, BuMed)

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IN MEMORIAN

Beamer, Charles Franklin LT MSC USN (Ret)
U. S. Naval Hospital, Portsmouth, Va., 8 October
McIntyre, John R. CAPT DC USN (Ret)
Anaheim, Calif., 10 October
Riney, Claude Raymond CAPT MC USN (Ret)
U. S. Naval Hospital, Oakland, Calif., 13 October
Hansen, Helen Marie LCDR NC USN
U. S. Naval Hospital, San Diego, Calif., 22 October
Keene, Ivy Harriet ENS NC USN (Ret)
U. S. Naval Hospital, Chelsea, Mass., 13 November
Cox, Theodore Edward LCDR MC USN (Ret)
831st Tactical Hospital, George Air Force Base, Calif., 16 November
Pulsifer, Donald Howard CWO2 USN (Ret)
U. S. Naval Hospital, Jacksonville, Fla., 19 November
Davidson, Andrew Blaine CAPT MC USN (Ret)
U. S. Naval Hospital, San Diego, Calif., 20 November
Ambrose, Anna Antonina LCDR NC USNR (Active Duty)
U. S. Naval Hospital, San Diego, Calif., 24 November
Shaw, Christopher Campbell CAPT MC USN
U. S. Naval Hospital, Philadelphia, Pa., 5 December
Heck, Mary Martha CDR NC USN (Ret)
U. S. Naval Hospital, Bethesda, Md., 6 December
McIntire Ross T., Vice Admiral MC USN (Ret)
Chicago, Ill., 8 December

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Biological Warfare Defense—Film Release

Wide interest is anticipated in the announcement that three new Medical Department films under the general title "Medical Defense Against Biological Warfare" are now being distributed. Subtitles of the series are "Basic Considerations" (MN-8549-a, 20 minutes), "Basic Plan Before Attack" (MN-8549-b, 17 minutes), and "Basic Plan After Attack" (MN-8549-c, 17 minutes). All are in color, and use a combination of art work and live photography to present their material.

These films give evidence of the awareness of modern military medicine of a matter that continues to cause concern and much speculation in both military and civilian society. The first of the three films, "Basic Considerations", reviews the military purposes of

biological warfare; enumerates and examines several standards that may be used in evaluating and selecting microorganisms for possible use as agents of warfare; shows a number of methods of dissemination that might be used; and emphasizes the need for medical defense, in particular, planning and organization required of medical personnel.

The second film, "Basic Plan Before Attack", bears a security classification but can be described as follows: It presents the importance of medical defense countermeasures in both overt and covert attack, and demonstrates several steps that the medical officer of a military base can take to prepare for possible attack.

"Basic Plan After Attack", the third of the series, opens by illustrating how an aggressor might use biologic agents in an attack. The film then proceeds to a demonstration of the plan by which medical personnel provide first aid and decontamination of casualties, rapid detection and identification of the biologic agent used, prophylactic and therapeutic measures, and means to control environment and people in it.

Prints of these films are being distributed as is customary to Naval District libraries, and also to certain units where there is special interest in the subject. If prints are not available from the usual source, address inquiry to the Film Distribution Unit, Training Division, Bureau of Naval Personnel, Department of the Navy, Washington 25, D. C.

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Directives

BUMED INSTRUCTION 1020.1 3 December 1959

Subj: Attire for hospital corpsmen and enlisted women of the Hospital Corps during on-duty hours

This instruction authorizes the wearing of white cotton coats by hospital corpsmen and white dental operating smocks by enlisted women of the Hospital Corps assigned to duties involving direct patient care and prescribes the types of such attire.

BUMED INSTRUCTION 6240.4 Change Transmittal 11 December 1959

Subj: Ch-1 to BUMED Instruction 6240.4 of 25 November 1958, Subj: Vending of foods and beverages; minimum sanitary requirements

This instruction excludes certain types of vending machines from BuMed Instruction of reference.

BUMED INSTRUCTION 6700.14B 20 November 1959

Subj: Authorized levels of supply and requisitioning objectives for medical and dental stores for vessels and activities not operating under Navy Stock Fund accounting procedures for cognizance symbol "L" material

This instruction cancels BUMED Instruction 6700.14A and describes procedures for accomplishing subject supply and requisitioning objectives.

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Board Certifications

American Board of Obstetrics and Gynecology
CDR Frederick G. Wiegand MC USN

American Board of Ophthalmology
CAPT Sherman M. Peabody MC USN

American Board of Otolaryngology
LT Howard F. Martin MC USNR (Active Duty)

American Board of Pediatrics
CAPT Edwin M. Leach MC USN

American Board of Plastic Surgery
CDR Robert W. O'Brien MC USN

American Board of Radiology
CDR Frederick W. George, III MC USN

American Board of Surgery
LCDR Vartzar Avedian MC USNR (Active Duty)
LCDR Robert J. Cales MC USN
CDR Richard B. Sarver MC USN

American Board of Thoracic Surgery
CDR Carl A. Broaddus, Jr. MC USN
CAPT Romulus L. May MC USN

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From the Note Book

Bureau Changes of Duties. CAPT Eugene V. Jobe MC USN, in recent years Head of the Bureau's Training Branch, and most recently, Director, Professional Division, retired from active duty on 1 December. Replacing him is CAPT Malcolm W. Arnold MC USN, previously Head of the Training Branch, which will now be headed by CAPT John W. Albrittain MC USN, who has been serving in the Training Branch in charge of Medical Corps Training.

CWO Goerner Elected to APHA. CWO Ralph T. Goerner, Jr. USN, Head of the Safety Section and Assistant in the Sanitation Section of the Bureau, was elected to Fellowship in the American Public Health Association at its Annual Meeting in October 1959. This affiliation will bring Mr. Goerner more closely in touch with Association and Section activities. (PrevMedDiv BuMed)

Sanitation Technicians Graduate. Graduation exercises were recently held for the 30th class to finish training at the Environmental Sanitation Technician School, U.S. Naval Hospital, Oakland, Calif. Dr. Ellis D. Sox, Director of Public Health for the City of San Francisco addressed the 23 graduates of the school which is headed by CAPT J. M. Coppoletta MC USN. (The Sanitation Technician, 1 December 1959)

CPC Loan Sets Available. A new series of CPC loan sets are being prepared at the Armed Forces Institute of Pathology. To date, 41 such sets are available for loan. Also available are 2 x 2" lantern slide sets on "Intracranial Calcifications" and "Peripheral Nervous System Tumors." Further information may be obtained by writing the Director, Armed Forces Institute of Pathology, Washington 25, D.C. (AFIP Letter, 1 December 1959)

Misleading Advertising. Representations to the public that salad oils, shortenings, oleomargarine, and similar products have value for reduction of blood cholesterol and prevention of heart attacks and strokes are false and misleading and will cause such products to be considered misbranded, the Food and Drug Administration, Department of Health, Education, and Welfare declares. Addition of unsaturated fats and oils to the otherwise unchanged ordinary diet will not accomplish this purpose, the FDA release stated, and pointed out that data on which such advertising is based is still experimental, incomplete, and contradictory. (USPH Service Release)

Atherosclerosis. A series of articles by Roberts, Moses, and Wilkins in Circulation for October 1959 presents findings of 500 consecutive autopsy studies in relation to occurrence of atherosclerosis, with and without antemortem indication.

Hypertension; Tumors of Childhood. The National Institutes of Health invites referrals as clinical material for newly introduced investigations of hypertension and solid tumors of childhood. For the former, attention will be focused on pheochromocytoma and hypertension of unilateral renal origin. Tumor types of particular interest include Wilms' tumors, neuroblastomas, sarcoma botryoides, and the lymphomas. Further information is obtainable from Dr. Louis Gillespie, Jr., National Heart Institute; and Dr. Clyde Brindley, National Cancer Institute, respectively. Both may be addressed at Bethesda 14, Md. (Washington Report on the Medical Sciences, 14 December 1959)

GI Complications from Vasoconstrictors. Reporting from the U. S. Naval Hospital, Bethesda, Md., the authors present 2 case histories and results of animal experimentation demonstrating intestinal hemorrhage and perforation incident to administration of vasoconstrictors. (CAPT R. B. Brown MC USN, et al, Annals of Surgery, November 1959)

Daily Allowance for Folic Acid. In an Editorial, the authors conclude that because small amounts of folic acid (400 mcg. or less) do not induce a response in patients with pernicious anemia, small amounts of folic acid in multivitamin capsules (around 200 mcg.) would be effective in preventing dietary deficiency of this essential substance without the risk of masking a developing case of pernicious anemia. (C Davidson and J. Jandl, Am. J. Clin. Nutrition, Nov.-Dec. 1959)

Physiologic Position for Delivery. Pleading for re-evaluation of the recumbent position for accouchement the author contends that parturition is easier and safer in the upright position. Recognizing that present mores are such that conservative thinking in this respect is regarded as being quite radical, he hopes to gradually convince colleagues of advantages of the technique. Patients are not hard to convince, he states. (F. Howard, Am. J. Obst. & Gynec., November 1959)

Esophageal Varices. This report describes a new technique employing an intragastric balloon for demonstration of esophageal varices, and reports that it provides increased accuracy. There were no complications; and no increase in esophageal bleeding occurred. (M. Nathan, Radiology, November 1959)

Antibiotic Treated Suture Material. Because non-absorbable suture material permits passage of tissue fluids the length of the thread, facilitating infection by passage of bacteria, the authors studied suitability of antibiotic treated material. Their experience showed accelerated cicatrization of incision closures without inflammation. (E. Echeverria, J. Olivares, Am. J. Surg., November 1959)

DENTAL SECTION

Anorganic Bone Grafting

A recent report by the Naval Medical Research Institute, National Naval Medical Center, Bethesda, Md., presented a preliminary account of experience with anorganic bone in surgical procedures on 149 patients, the patients being followed from 5 months to 2 years postoperatively. When properly handled anorganic bone has been well tolerated by the host and rapidly incorporated in reparative callus at an early stage. With one exception, no untoward responses in this series of cases occurred. If the material is too fine, a nonspecific inflammatory response may be anticipated. In the presence of infection, tissue necrosis, or avascularity, anorganic bone is poorly tolerated, and becomes extruded or walled off as would other alloplastic materials.

Studies of radiologic evolution of anorganic bone grafts, compared with homogenous bank bone grafts, have revealed a slower rate of removal of the anorganic bone implant.

Grafting with anorganic bone should not be used when fixation is required because of extreme fragility of the material. It serves best as an implant or filling material in bone defects where it acts to prevent the invasion of fibrous connective tissue, and, at the same time, to supply an absorbable trellis through which new bone from the host may develop. As a basic criterion for clinical use, anorganic bone should be employed only in osseous defects which would reconstitute themselves, provided fibrous tissue were prevented from entering the empty space, and then only in situations where first and second grade grafts are not available.

Preliminary findings indicate that further experimental and clinical evaluation must be undertaken before this material can be recommended for general use. The real significance of this study may be in its application to understanding of the basic nature of bone as tissue.

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Blood Loss From Surgical Procedures

Loss of blood from oral surgical procedures as it affects the state of nutrition of the patient has been underestimated. Recent investigations have demonstrated that such blood loss ranges from 35 to 902 ml. The

volume of blood loss approximated that of such general surgical procedures as gastric resection, appendectomy, herniorrhaphy, and nephrectomy. In some cases, postoperative blood loss was said to be as large or larger.

Plasma volume replacements occur within 24 hours. However, there is a lag of from 6 to 8 weeks for red cell replacements. There are also losses of other important cellular nutrients. Therefore, it would be prudent for the oral surgeon as well as those performing gingival and soft-tissue surgery and remodeling of alveolar bone to prescribe a high-protein diet and vitamin supplements preoperatively and postoperatively.

It is assumed that the dentist will have consulted the patient's physician to be sure that there are no contraindications for the prescription of diets or vitamin supplements. It is also understood that vitamin supplements will not cure dental diseases or overcome ineffective diagnoses and dental procedures. Minerals and trace elements have not been considered in the present article because the requirements are very small and are usually supplied even in the most restricted diets of patients undergoing dental operations.

The dentist is in an enviable position to detect early oral signs of nutritional deficiencies. This can be of inestimable value to both physician and patient. Until such time as dental disease can be prevented, the combined efforts of the health services, the government, and the public must be enlisted to repair oral disease and preserve oral health in order to add years to patients' lives and life to the years of the aging population. (Roth, Harry, D.D.S., Diet, Nutrition, and Dentistry: Oral Surg., July 1959)

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Integrity

Integrity is a word that should go hand-in-hand with profession. Not to stretch a point too far, it should even be synonymous with dentist.

Integrity is a moral principle of soundness— strictness in fulfilling contracts, freedom of corruption in rendering service. In the practice of dentistry, it is often challenged by time limits, habit, and outside influence of current trends.

Because of comparative isolation, lack of monitorship, privacy of ministrations, and very uniqueness of possession of certain skills and knowledge, the dentist cannot shift his responsibilities to the shoulders of another outside his profession. Things dental begin and end with the dentist. There is no other recourse.

The boundaries of integrity are not limited in compass to a pay-for-service category. In our domain it embraces every phase of dentist-patient relations from examination through completion of treatment, including

patient education and counsel in prevention of dental disease. It should pervade officer-membership kinship and dominate citizen-community esprit de corps.

The exercise of integrity requires courage and unselfishness and, sometimes, suppression of ego. It draws a finer bead on conduct than legal restraint or the discipline of ethics. Flagrant violation of the law and wide detour around the principles of professional ethics may be dealt with by others. But lack of integrity is a matter to be judged by a court of conscience. If settled here it will never qualify for further judgment.

A man may be an expert in the use of firearms or operation of a motor vehicle, but if he lacks courtesy, honesty, and altruism he is a menace to society and a threat to the safety of others. By the same token, a dentist may be well educated and highly skilled in his field, but if he lacks integrity he is a discredit to his profession and obstructs the rights of those who entrust themselves to his care.

Integrity puts most other virtues begging, because the latter are needed only to make life more bearable where the former ceases to exist. More than any other virtue, it is the one that has made our profession a noble one down through the years. It is a part of our heritage that should not be forgotten. (Brough, R. D., D.M.D., Editorial: Bulletin, Fifth District Dental Society, State of New York, October 1959)

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Music in Dental Department

Many civilian dental practitioners utilize soft music in their operating rooms and ancillary spaces in an effort to create a quiet, restful atmosphere for the benefit of their patients. Soothing music is intended to produce a calm or tranquil influence upon persons.

Through an arrangement with the Special Services Officer, U. S. Naval Air Station, Jacksonville, Fla. and the MUZAK Corporation of Jacksonville, a system of 21 individually controlled speakers were installed throughout the Naval Air Station Dental Department. The system is an extension of an existing system and is provided at no extra cost over the original contract. The system provides an even flow of soft music from tapes for a period of 20 minutes and a period of rest or interruption of four minutes. Since the system has been in use, CAPT M. G. Martin DC USN, Senior Dental Officer, has received many favorable complimentary reports from both patients and staff personnel.

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Personnel and Organization Notes

Admiral Schantz Elected to Commission. At the 47th Annual Session of the Federation Dentaire Internationale held in New York in September 1959, Rear Admiral C. W. Schantz DC USN, Assistant Chief of the Bureau of Medicine and Surgery (Dentistry) and Chief of Dental Division, was unanimously elected a co-opted member of the Commission on Armed Forces Dental Services for a term of one year.

CAPT Erdman Reviews Troops. CAPT Robert F. Erdman DC USN, recently received the "eyes right" salute during recruit graduation ceremonies at the U. S. Naval Training Center, Great Lakes, Ill. He entered the Navy in 1941 as a Lieutenant (jg), a short time later while serving as dental officer onboard the USS ATLANTA, which was sunk during the battle for Guadalcanal, he was awarded the Presidential Unit Citation with a Blue Star. CAPT Erdman is an assistant dental officer, Administrative Command, U. S. Naval Training Center, Great Lakes, Ill.

Foreign Officers Visit Dental School. A group composed of 23 medical officers and dental officers from the navies of Allied Foreign Nations and 2 Nurse Corps Officers from Korea attending the Naval Medical Management and Naval Preventive Medicine courses at the U. S. Naval Medical School, National Naval Medical Center, Bethesda, Md. recently visited the Naval Dental School. The officers were briefed on the overall program of the Navy Dental Corps, ashore and afloat, and specifically on the work being done at the school. The group, representing 12 countries, is attending courses at the National Naval Medical Center under President Eisenhower's People-to-People Program.

Dental School Hosts American Board. The U. S. Naval Dental School, National Naval Medical Center, on 5 and 6 December 1959 was host to the American Board of Oral Pathology for the purpose of examining candidates for certification. Dr. H. B. G. Robinson, Dean, Kansas City-Western Dental College, Kansas City, Mo., is President and Dr. D. A. Kerr, School of Dentistry, University of Michigan, is Secretary-Treasurer.

Dental Department Honored. The Dental Department of the U. S. Naval Air Station, Alameda, Calif., CAPT L. H. Daniel DC USN, Senior Dental Officer, was recently honored by being the first recipient of the Commanding Officer's Honor Division of the Month Plaque. The dental department was chosen on a percentage grade score computed by division officers for disciplinary record, safe driving record, and results of the captain's personnel inspection.

Dental Company Airlifted. During 12th Dental Company's Dental Field Exercise 1-59, under Commanding Officer, CAPT R. J. Wallenborn DC USN, officers, men, and equipment of the company were airlifted to the site of their three day field exercise. Once on the site, dental field equipment was set up and the company treated patients from the regular dental sick call. Patients were transported from the main dispensary to the field site by motor transport and returned following treatment.

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Procurement of Facings and Backings

In early November, the Field Branch of the Bureau of Medicine and Surgery sent to each authorized prosthetic activity a copy of the negotiated contract with the Columbus Dental Manufacturing Company for the procurement of porcelain and plastic facings and metal backings. Information from the Manufacturer indicates that some activities are not complying with the provisions of this contract in ordering the above items.

Additional copies of, or information pertaining to, this contract may be obtained from Chief, Field Branch, Bureau of Medicine and Surgery, 3rd Avenue and 29th Street Brooklyn 32, New York.

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RESERVE SECTION

Naval Reserve Staff Corps Officer Promotion Zones—FY 1960

BUPERS NOTICE 1412 of 9 November 1959 promulgates Reserve officer promotion zones and tentative convening dates for selection boards convening in fiscal year 1960. Promotion zones are listed in the table.

The following will be considered eligible:

a. Reserve officers in the grades of lieutenant (junior grade) and above, within established promotion zones, will be considered provided they are:

(1) TAR officers on active duty (XXX7 designator); or

(2) on active duty but have not been considered by an active duty board meeting in fiscal year 1960; or

(3) Reserve officers on inactive duty, in an active status, and who have earned at least 12 retirement points in fiscal year 1959 or 12 retirement points in the anniversary year ending in fiscal year 1959. (Officers released from active duty on or after 1 July 1956 are not subject to these retirement point requirements.)

b. The promotion plan for warrant officers will be promulgated at such time as the proposed promotion plan is finally resolved.

c. Officers of the Nurse Corps Reserve are eligible for consideration for promotion when they are senior to the junior officer of the same grade of the Nurse Corps on active duty on the lineal list of the Nurse Corps who has been selected for promotion. Accordingly, promotion zones for Reserve officers of the Nurse Corps will be established upon final approval of the fiscal year 1960 lineal list selection boards for Nurse Corps officers.

Fitness Reports. Officers who are within the promotion zones should insure that fitness reports for training duty and/or annual fitness reports and annual qualification questionnaires covering periods ending prior to convening dates are submitted to the Bureau of Naval Personnel in time to be included in the officers' records when presented to the applicable selection boards. Special fitness reports are not required.

Promotion Zones - Fiscal Year 1960

For Promotion to:	CDR	LCDR	LT	LTJG	ENS
Captain	Present d/r 10-1-53	10-3-45	10-1-43	10-1-42	9-10-41
Commander		Present d/r 7-1-56	7-5-51	8-1-46	10-16-44
Lieutenant Commander			Present d/r 7-1-55	6-27-52	6-27-50
Lieutenant				Present d/r 12-16-57	6-16-56

Convening Dates

Captain and Commander Boards - 23 February 1960

Lieutenant Commander Board - 26 April 1960

Lieutenant Board - 31 May 1960

The promotional history of the junior officer in the promotion zone is shown in the table. An officer whose date of rank in present grade is earlier than the date of rank shown is in the promotion zone. An

officer whose date of rank in present grade is the same as that shown in the table must have a date of rank in each succeeding lower grade equal to or earlier than the date of rank shown in order to be eligible. An officer whose promotional history is identical to that shown in the table is in the appropriate zone unless notified otherwise. Because of the transition between the 1955 and 1959 Naval Reserve Registers, register numbers have been omitted.

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Applications Desired for Naval Reserve Staff Corps Selection Boards

Allocations for membership on Reserve officer staff corps fiscal year 1960 Selection Boards have been promulgated to Commandants all Naval Districts (less 10, 14, 15, and 17).

Applications to serve as a principal, or an alternate are desired from Reserve Medical Corps personnel in the rank of Captain for membership of boards convening in the Navy Department on 23 February and 31 May 1960. Also applications from Commanders for membership on boards convening 26 April and 31 May 1960 are desired. Interested eligible individuals should submit their requests for this activy duty for training to their respective commandants. Eligibility is determined by the following criteria:

a. Nominee must be a member of the Ready Reserve.

b. An officer who served as a member of a promotion selection board, active or inactive, the previous fiscal year is not eligible to serve as a member on a promotion selection board, either active or inactive, during the current fiscal year for promotion to the same grade as the previous fiscal year board on which he served. If desired, such an inactive officer may be nominated for membership duty on Reserve promotion selection boards to other grades.

c. Nominees should normally be in a physical classification "A" although physical risk classification "B-1" is acceptable. A physical risk classification "B-2" nominee may be accepted by the Chief of Naval Personnel under special circumstances with each such case depending on its own merit and the board make-up conditions existing at the time. Normally a physical risk classification "B-2" nominee would not be approved if a sufficient number of principals and alternates of a higher medical classification and of at least equal or better potential were available. A physical risk classification "C" officer is considered ineligible.

d. An officer who has not had a quadrennial physical within four years of the date of submission of nomination is considered ineligible.

e. Officers having failed of selection once or more for promotion except to the grade of rear admiral, are not normally considered eligible

to serve as members of promotion selection boards. Officers have failed selection at least once if their seniority placed them in a duly announced promotion zone and their names did not subsequently appear on a published list of selectees.

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OCCUPATIONAL MEDICINE

Pulmonary Response to Blast Furnace Stack Dust

Intrapulmonary iron deposits are not known to produce clinical disease even though such deposits may produce roentgenologic opacities which, to the inexperienced eye, may suggest an alarming degree of disabling disease. In the authors' laboratory, iron as ferric oxide has behaved like an inert dust and has caused no greater connective tissue response in lungs of experimental animals than has carbon or clay (Kaolinite). As a matter of fact, iron was found to be capable of inhibiting fibrogenic action of silica in lungs of animals as early as 1932. This ability of iron to inhibit or modify silicosis has been confirmed by a number of other observers.

The solid constituents of stack effluents from blast furnaces may contain a considerable amount of iron together with siliceous and other components. In spite of the most modern equipment, a very small percentage of such stack effluents may defy entrapment and escape into the atmosphere, thus constituting an air pollutant capable of being inhaled by people in the vicinity of such plants. What effect solid constituents of stack effluents from blast furnaces would have on lungs of experimental animals therefore has some practical as well as scientific interest.

The authors' purpose is to report results of an investigation in which solid constituents of stack effluents from a blast furnace were injected into lungs of rats as a single moderately large dose and also as multiple large doses repeated as many as eight times over a period of 6 months.

METHODS AND MATERIALS

In order to give added meaning to this investigation, pulmonary injections with blast furnace stack dust were paralleled in other animals by similar injections of kaolin dust and quartz dust respectively. The latter two dusts were to furnish bench marks to which effects of the stack dust were to be compared.

Blast furnace stack effluent dust used for the injections was considered representative and consisted of a dark red-brown powder. Another portion of the dust was suspended in water and allowed to settle for five minutes, and the top portion was poured off for subsequent use. Aqueous dust suspensions were standardized to contain 25 and 30 mg./ml., respectively. Average particle size in these suspensions was 5.8 micron.

A total of 180 rats were used, divided into two series. One series consisted of three groups of 30 rats each which were given a single intratracheal injection of 30 mg. of the respective dusts with the smaller average particle size. The second series, also consisting of three groups of 30 rats each, were given multiple injections of the respective dusts, but of larger particle size. The first injection of the second series consisted of 30 mg., but subsequent injections were 25 mg. The first two injections were 2 wks. apart. A total of 230 mg. of dust was thereby administered. At the end of this time it was thought that the few rats which had survived in the quartz group could not withstand further dosing. It was therefore decided to stop all injections.

Intratracheal injections of kaolin and quartz dust with very small average particle size were associated with a high immediate mortality. It became necessary to administer fine quartz dust in two doses of 15 mg. each, 5 days apart in order to obtain 30 survivors. In the case of the kaolin dust, a sufficiently large number of rats were injected until 30 survivors were obtained (mortality rate was approximately 50%). Injections were accomplished by means of self-retaining, illuminated laryngoscopic speculum under light ether anesthesia.

All animals of the first series were killed with ether 18 months after initiation of the study, and those of the second series were sacrificed 14 months after initial injection and 7-1/2 months after the last. A few rats from each group were killed at intervals for the purpose of sampling but many animals died of intercurrent disease. All animals were autopsied, the lungs inflated with formalin, and paraffin sections were prepared in the usual manner. In addition to usual staining procedures, incineration studies were also performed.

RESULTS

General. Because of endemic pulmonary disease, there was an appreciable mortality rate from spontaneously arising pneumonia and complications such as empyema. This was undoubtedly aggravated by intratracheal manipulations incident to dust injections. In the case of the single (with silica, two-fold) injections, mortality from such spontaneous infections averaged 33%. With multiple intratracheal injections, mortality was appreciably higher.

The higher mortality rate of cumulative quartz dust injections was caused by massive silicotic involvement of lung tissue that left an amount of functioning parenchyma insufficient to support life.

Stack Dust (single 30 mg. dose). Grossly, the only deviation from normal was a mottled black pigmentation of the pleura and the cut surface.

Microscopically, the main lesion was likewise solely one of pigment deposition. There were no significant differences in appearance of the lungs examined at different time periods following intratracheal injection. Distribution of the dust lacked uniformity. In some animals, dust was confined largely to one lung, and in others one or several lobes were found practically devoid of dust. Even within the lobes, distribution of dust was irregular and did not follow any pattern.

The dust formed dense black pigment masses which filled clusters of air spaces. The pigment was so densely aggregated that macrophages could not be identified. However, there were many areas, particularly near foci of inflammation, where disintegration of alveolar pigment masses seemed to be in progress. Here it could be established that the dust was intracellular and that the pigment masses were composed largely of densely packed, dust-filled macrophages. Interstitial deposition of dust was scanty and could be demonstrated with certainty only in loose periadventitial stroma of some vessels and bronchi where it was likewise intracellular. In regions of frank pneumonia, it was uncommon to encounter more than an occasional pigmented macrophage. Many animals suffered from chronic bronchitis endemic to rats. As a result, one or several lobes of these animals frequently was atelectatic due to bronchial obstruction. Such atelectatic lobes were commonly heavily burdened with dense dust deposits diffusely distributed. No connective tissue fibers could be demonstrated in connection with dust deposits but some alveolar walls were thickened by swelling and proliferation of alveolar lining cells.

In harmony with the paucity of interstitially situated dust, little or no dust deposition could be found in the pulmonary lymph nodes. As a matter of fact, more than one-half of the nodes encountered in the sections failed to demonstrate any pigment whatsoever. However, when dust was present in lymph nodes, it appeared to be inert because no reaction to its presence was demonstrable.

Kaolin Dust (single 30 mg. dose). Similar to the above stack dust animals, the only evidence of kaolin dust injection visible to the naked eye was a slight mottling by opaque gray pigment upon pleura and cut surface.

Microscopically, kaolin was disposed in well-circumscribed, frequently angulated foci composed of closely packed, large, pale macrophages filled with fine, nearly colorless particles. In regions of edema and pneumonia, kaolin dust depots were more difficult to find and often the only indication of dust was the presence of scattered dust-filled macrophages.

In keeping with the predominantly interstitial position of dust depots, all nodes found in the sections contained kaolin deposits.

Quartz Dust (single or divided 30 mg. does). Grossly, animals in this group showed scattered silicotic nodules on pleural and cut surfaces.

In some animals, an atelectatic lobe was studded with such nodules. Tracheal lymph nodes were usually enlarged and hard.

Microscopically, the sections of the lungs were characteristic of silicosis as usually encountered in this animal. In atelectatic lobes, nodules tended to be confluent.

Stack Dust (multiple doses). Grossly, results differed from those of single dose only in intensity of pigmentation.

Microscopically, the sections were characterized by larger and more numerous foci of pigmentation than was the case in animals given the single dose. The nature of dust deposits was identical. Relatively little pigment was found interstitially and lymph nodes also contained little dust. No fibrous tissue response was found in the lungs or lymph nodes secondary to dust deposits. Between involved foci, lung tissue was essentially normal.

Kaolin Dust (multiple doses). Gross appearance of the lungs of this group was similar to that of the group given the single dose of the same dust except for a more pronounced pigmentation.

Tracheal lymph nodes contained masses of crowded reticulum cells filled with fine dust granules similar to the nodes associated with single-dose animals. No collagen production could be demonstrated in these lymph nodes.

Quartz Dust (multiple doses). Most of these animals died before the experiment was terminated. Lungs of these rats were nodularly consolidated and hard. Cut surfaces resembled cartilage and showed very little spongy lung tissue. The impression was gained that many of these animals died, not so much of an incidental pneumonia as of respiratory inadequacy. Lymph nodes draining these lungs were uniformly enlarged and hard.

Microscopically, silicotic nodules were of varying degrees of maturity with extensive collagenization and confluence. In addition, air spaces between the nodules tended to be filled with desquamated alveolar macrophages.

Tracheal lymph nodes were the seat of extensive fibrosis and masses of large reticulum cells filled with quartz dust which had replaced lymphocytic tissue.

DISCUSSION

There are two highly significant features of the pulmonary reaction to blast furnace stack dust. The first is that in the rat there is no discernible connective tissue reaction to the presence of dust in either lung tissue or lymph node. This would seem to classify this dust as even more inert than kaolinite in which a minimal connective tissue reaction is usually demonstrable. The second feature is the storage of dust almost exclusively in air spaces and its extremely limited ability to penetrate lung interstitium.

According to a recently suggested modified concept of pneumoconiosis, dust may penetrate the alveolar membrane only as naked particles. Dust

which has been ingested by phagocytes is rendered harmless and is incapable of penetrating into lung interstitium as long as it remains inside of the cell. Since stack dust is readily phagocytosed and very little, if any, was found in extracellular position, these facts offer a reasonable explanation for the limited ability of stack dust to penetrate into lung stroma and also for the extremely small amount of dust found in tracheal lymph nodes.

The relatively normal state of alveolar walls in spite of the tremendous overload of stack dust introduced into the lungs by multiple injections underscores the biologic inertness of this dust. (Gross, P., Westrick, M.L., McNerney, J.M., The Pulmonary Response to Blast Furnace Stack Dust: Am. Indust. Hyg. A. Quart., 20: 197-204, June 1959)

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Health Education in Industry

Preventive maintenance is widely recognized as a superb idea everywhere—at home, on the road, in business—except for our own bodies. The tendency is to avoid professional medical advice as long as possible, operating the body at or above full capacity, as long as it is possible. The "do-it-yourself" trend extends into health care. As a result of self-diagnosis and treatment of bodily ills, manufacturers of patent medicines have a field day.

Importance of Health to Industry

Health has tremendous significance for industry—90% of absenteeism comes from sickness and accidents outside the plant. According to estimates, each working day sees 2,000,000 employees away from their jobs because of sickness. Not all this illness could have been prevented, but it is reasonable to assume that common-sense hygienic living would prevent a good part of it.

There are 5.5 million people in the United States who are suffering from some long-term illness. One and eight-tenths million are between 45 and 65, and 1.4 million are under 45 years of age. This is an enormous drain on the economy and a tremendous loss of trained and skilled manpower.

Decreased efficiency results from conditions which do not necessarily show up in absenteeism statistics, such as poor diet, fatigue, alcoholism, and poor human relationships at home and in the plant. These conditions affect the productivity of the worker, lead to accidents, result in waste of time and materials, and disrupt morale. Those persons who come to work may represent a larger drain on industry than those who stayed at home.

Problems Which the Individual Faces in Maintaining His Health

The individual must eat a balanced diet; strike a balance among work, rest, and play; practice good personal hygiene; and learn something about

his own mental health and how to maintain it.

Recreation depends on ones inclinations and what is socially acceptable in his circle. Man cannot long be idle without deteriorating. What working people do after work hours may have a profound effect on their productivity during the working day. Future developments, such as the advance of automation, may have equally important effects. With automation, the job may become less complex and thereby less challenging and less satisfying to the worker. How well his full capabilities are used on the job may have a definite bearing on the worker's attitude.

The individual must learn to discriminate between poor and good health advice. How one thinks and feels about health is in part dependent upon early experiences at home and in school. In the ever-growing field of health, complex in both content and motivation, need for continuous adult education for healthful living must be recognized.

Industry's Role in Health Education

Industry must impart health information to employees through bulletin board posters, leaflets, articles in plant newspapers and magazines, films, talks, exhibits, and the educational values inherent in a good medical department. In a statement prepared by the Council on Industrial Health of the American Medical Association, a section on "Health and Safety Education" states:

> An occupational health program should promote the education of employees in matters of personal hygiene and health and encourage the use of safeguards provided to protect against any hazards to health which may be inherent in their jobs. . . . Health and safety education involves the cooperative efforts of health, safety, and operating personnel. Such education should include not only the encouragement of habits of cleanliness and orderliness but also instruction in collaboration with the employee's supervisor in safe work practices. . . . Employees should be encouraged to participate in the planning and conduct of health education activities and to make full and effective use of occupational health services and facilities available to them.

Industry has also accepted a more active role for its medical departments. Preemployment examinations, periodic health maintenance examinations, and emergency medical care in the plant provide opportunities for medical personnel to reach the employees and to influence their knowledge, attitudes, and perhaps even their health behavior. Face-to-face discussion between nurse and employee or doctor and employee allows the professional person to get at the questions and problems, real or imaginary, which the employee may have.

Health education by industry involves the plant foreman and supervisors who come in daily contact with the employee. They know the individual's normal behavior and with some help can detect many deviations from the normal. A word at the appropriate time may influence the employee

to obtain the services of the plant nurse or physician.

In small work establishments without medical departments, foremen and supervisors can be alert to changes in an individual's normal health behavior. One of the major problems of industry is to provide some type of occupational health supervision to employees of small establishments. A government agency has estimated that only 20-25% of the working force are reached by health and medical services in their place of employment. More than 75% of the working force in small plants have virtually no health maintenance services.

The community around the industrial plant and its possible contribution to the health education of the workers in the plant has great potential. Largely through the efforts of local associations, thousands in industry each year receive x-rays of their chests for detection of tuberculosis. The plant should set up a program in cooperation with community agencies as well as invite outside program makers. In several programs conducted in different parts of the country, it has been shown that an effective health education program can be presented which will have meaning for both employees and management. The first requirements are that the program should be planned with the help of a representative group from within the industry or plant, and that it should be based on the expressed health interests of the employees concerned.

What industry can do to help educate its employees to reach and keep a state of good health is very important. It is eminently practical that industry take a prominent role in developing health education in the community as a whole, participating in that effort with all other agencies involved.

Health conditions in the community affect employees just as do health conditions in the plant. For greatest benefit to itself and to its workers, therefore, industry must become interested and concerned with all conditions in the community which affect health. It must be willing to participate in community planning and community action which are aimed at bringing about better health for all. (Lifson, S.S., M.P.H., Health Education in Industry—Practical Consideration for Actual Programs in Industry: Am. J. Pub. Health, 49: 1357-1363, October 1959)

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Salt Deficiency Heat Exhaustion

Salt-deficiency heat exhaustion is an occupational hazard to workers in hot industries but may also occur in unacclimatized visitors to hot climates. Under hot conditions, salt loss in the sweat and urine may exceed dietary intake. Salt saving mechanisms, chiefly reabsorption of salt by renal tubules and secretion of sweat at lower concentration may be inadequate to prevent depletion of body reservoirs. The resulting loss of extra

cellular fluid volume is the foundation upon which the major clinical features are laid. Further complications arise if large volumes of water are taken without salt or if further reduction in salt intake and added loss of chloride result from anorexia and vomiting.

Leithead, Leithead, and Lee report clinical and laboratory findings in 59 cases among oil tanker crews visiting the Persian Gulf during summer months of 1956 and 1957. (Ann. Trop. M. Parasit., 52: 456-467, December 1958) Developing over 3 to 5 days, major symptoms were fatigue (100% of cases), giddiness (80%), anorexia, nausea, vomiting, and muscle cramps (60%), constipation (50%), headache (40%), diarrhea (30%), and syncope (10%). Oligemic shock with hypotension and coma was present in three cases. Elevated pulse rate and low pulse pressure were found in 25 others. Oral temperature tended to be subnormal (average 97°F.). Principal laboratory findings were a reduction in blood sodium and chloride (more evident in whole blood than plasma), elevated blood urea and plasma proteins, and a virtual absence of sodium and chloride in the urine (less than 1 gm. /liter). Potassium levels were inconsistent.

Diagnosis is based on a history of excessive sweating followed by symptoms such as fatigue, vomiting, and muscle cramps together with laboratory findings of salt depletion.

Treatment requires bed rest in cool surroundings and intake of salted fluids by mouth, or by vein, if indicated by the presence of shock or vomiting. Treatment is continued until urine chloride (as NaCl) exceeds 3 gm. /liter. This may take 5 to 7 days in severe cases.

To prevent salt-deficiency heat exhaustion in men aboard ship in the Persian Gulf, a minimum intake of 20 gm. of salt per day is recommended for men on upper decks and 30 gm. for personnel in engine rooms and galley. Addition of extra salt to food is preferable to the taking of salt tablets. (CAPT D. Minard MC USN, Thermal Stress Branch)

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Environmental Physiology

Twelve cases of heat illness, differing in major aspects from recognized disorders caused by heat, were admitted to the British Army Hospital at Aden in September–October 1958. The syndrome was characterized by a sudden decrease or cessation of sweating in young unacclimatized males during or immediately after exertion in severe heat. The mean morning effective temperature during this period was 93°F. in the sun. Oral temperature on admission did not exceed 102°F. Thus the syndrome differed from heat hyperpyrexia and heat stroke in which body temperature is 106°F. or higher. Symptoms were mild compared with heat stroke consisting chiefly of exhaustion, drowsiness and mental confusion. There was moderate dehydration but no salt deficiency. Intercurrent infection was absent.

The skin was flushed hot and dry but free of eruptions. Body temperature subsided at bed rest without recourse to special cooling. Sweating returned to normal within a few hours. Thus these cases also differed from anhidrotic heat exhaustion of the type described by Ladell and others which is a sequel to severe prickly heat and requires weeks for return of normal sweating. The author suggests the term "acute anhidrotic heat exhaustion" for the cases observed at Aden. Recognition of this disorder is important to prevent its progress to heat stroke and to clarify etiologic factors which may be common to both. (Bannister, R., Acute Anhidrotic Heat Exhaustion: Lancet 2: 313, September 1959)

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Industrial Hygienists in Critical Category

Announcement has been made by the U. S. Civil Service Commission, (Department Circular #793, Supplement No. 56, of 30 October 1959) of the inclusion of the positions of Industrial Hygienist and Health Physicist in the critical category classification. By this action, the Commission increased the minimum starting rates of compensation for these positions. This salary increase will improve the Government's competitive position in procuring civilian industrial hygienists and health physicists.

The announcement successfully culminates coordinated efforts of the Bureau of Ships, Bureau of Weapons, Office of Industrial Relations, and the Bureau of Medicine and Surgery to achieve recognition of the critical shortage of personnel qualified in industrial hygiene. During the past few years, shipyards, naval air stations, and ordnance plants have experienced great difficulty in recruiting industrial hygienists. Positions of assistant industrial hygienist in several shipyards and air stations have never been filled. It was impossible to attract young, qualified men because of salary advantages in private industry. There has been even greater difficulty in recruiting experienced, qualified men acceptable to replace two senior industrial hygienists who resigned to accept better paying positions. The difficulty experienced in augmenting medical department industrial hygiene staffs of shipyards in preparation for nuclear powered vessel construction, overhaul, and repair work further focused attention on the importance of improving the competitive position of the Government in recruiting its share of the admittedly scarce national supply of industrial hygienists and specialists in health physics.

One of the measures to increase entering salaries for scientific personnel in government is the Civil Service Classification Act of 1949, as amended. Industrial hygienists or health physicists had not been included among the scientific and professional specialties listed in the Act. The educational qualifications for industrial hygienists and health physicists and the national scarcity of personnel in relation to the demand

pointed to the fact that these positions should be included. By joint action of medical, production, and industrial relations departments of commands and the dynamic support of the respective management bureaus and the Office of Industrial Relations, the facts were successfully presented to the Civil Service Commission.

Whether or not the higher entrance salaries will be adequate to compete successfully for high caliber personnel remains to be seen. Certainly the new minimum pay rates improve the Government's position, and the recognition of distinction implied in critical category status should be an inducement. Whatever the final result, the great support given by commanding officers, management bureaus, and the Office of Industrial Relations is indicative of the high regard for the value of the industrial hygiene programs being conducted by medical departments in the industrial activities of the Navy. (Johnson, G. A. L., CDR MSC USN)

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Health Protection in Beryllium Facilities

Investigators agree that beryllium per se is the causative agent of a unique occupational illness. However, it has been clearly demonstrated that application of suitable engineering control measures can make handling of beryllium and its compounds no more hazardous than that of other more common toxic industrial materials. Experience gained over a ten-year period in operation of beryllium facilities under contract to the Atomic Energy Commission has resulted in practical, proven, control measures that can serve as guides in the engineering design and safe operation of new or modified installations. The facilities represent a wide spectrum of operations from small laboratories to full scale production plants.

Specific processes with which A. E. C. has had contact include: (1) production of oxide and hydroxide from beryl ore, (2) reduction of metal from salt, (3) oxide fusion, (4) vacuum casting of metal ingots from "pebbles," (5) production of metal flake by chlorination and electrolysis starting with oxide, (6) fabrication of beryllia ceramics, (7) sublimation of beryllium fluoride from a mixture of magnesium fluoride and beryllium fluoride, (8) powder metallurgy operations, and (9) metal machining and fabrication.

The purpose of this report is to summarize information gathered during design and operation of these facilities so that it may be used in providing for safe handling of beryllium materials. (Breslin, A. J., Harris, W. B., Health Protection in Beryllium Facilities: Arch. Indust. Health, 19: 596-648, June 1959)

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Copper Poisoning from Vending Machines

The check valves in a post-mix type vending machine if not functioning correctly may allow carbon dioxide to enter the water supply line. In the event that the line is made of copper, carbon dioxide or carbonated water will react with the copper. Under certain conditions, the quantities of copper going into solution could be quite large. Thus, copper poisoning could occur from a beverage dispensed from a post-mix type carbonated beverage machine.

Recommendations are that these type machines be designed and constructed to preclude contact between copper and carbon dioxide or carbonated water, and that they be equipped with a device or devices which provide positive protection against backflow of carbon dioxide or carbonated water into the building water supply system. (Hopper, S. H., Adams, H. S., Copper Poisoning From Vending Machines: Pub. Health Rep., 73: 910-914, October 1958)

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